

# **METHODS OF CHARGING, EQUALIZING AND CONTROLLING LI- BASED BATTERIES**

## **Abstract**

Method of charging Li-based battery involves keeping the right balance among battery voltage, ohmic resistance, and charging current. Invention offers battery overvoltage protection value as the difference between the maximum voltage and the instantaneous open-circuit voltage. Overvoltage protection is supported when the minimum charging current is set as the ratio between difference in battery terminal voltage and instantaneous open-circuit voltage, and ohmic resistance. Method of equalizing Li-based battery is based on stabilization of cell voltage at end-of-charge by connecting in parallel to each cell, three series-connected Ni-based (i.e., NiCd or NiMH) cells, which serve as voltage stabilizers at end-of-charge. Individual lithium cell ( flying cell) periodically connected to battery cells in process of charging and (or) discharging is used for equalizing of lithium battery cells. Method of controlling Li-based battery is based on measurement of battery ohmic and chemical resistances, and open-circuit voltage, with and without current interruption. Ohmic resistance controls the battery charging process and battery state-of-health. Nonstationary open-circuit voltage is used as an indicator (fuel gauge) of battery state-of-charge. Electrical double layer capacity

provides information regarding electrode surface.